KRAMER ELECTRONICS, Ltd.

USER MANUAL

Video/Audio Distribution Amplifiers

Models:

VM-2N, VM-5S, VM-50A,
VM-50H, VM-50V, VM-50YC

IMPORTANT: Before proceeding, please read paragraph entitled "Unpacking and Contents"

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1. INTRODUCTION

Congratulations on your purchase of this Kramer Electronics amplifier. Since 1981 Kramer has been dedicated to the development and manufacture of high quality video/audio equipment. The Kramer line has become an integral part of many of the best production and presentation facilities around the world. In recent years, Kramer has redesigned and upgraded most of the line, making the best even better. Kramer's line of professional video/audio electronics is one of the most versatile and complete available, and is a true leader in terms of quality, workmanship, price/performance ratio and innovation. In addition to the Kramer line of high quality amplifiers, such as the one you have just purchased, Kramer also offers a full line of high quality switchers, processors, interfaces, controllers and computer-related products. This manual includes configuration, operation and option information for the following products from the Kramer VM line of distribution amplifiers. All these VM amplifiers are similar in operation and features.

- **VM-2N**- 1:2 Video/Audio Distributor
- **VM-5S**- 1:5 Video/Audio Distributor
- **VM-50A**- 1:5 Audio Distributor
- **VM-50H**- 1:5 Headphone Distributor
- **VM-50V**- 1:5 Video Distributor
- **VM-50YC**-1:5 s-Video Distributor

1.1 A Word On Distribution Amplifiers

Distribution amplifiers are used to distribute one source to several acceptors for simultaneous recording or monitoring of one source, with no discernible signal degradation. They vary in the number of inputs, looping capability, programming capability, number of outputs, operating format, bandwidth and input/output coupling. A good quality distribution amplifier amplifies the incoming signal, pre-compensates the signal for potential losses (resulting from the use of long cables, noisy source, etc.) and generates several identical buffered and amplified outputs.

1.2 Factors Affecting Quality of Results

There are many factors affecting the quality of results when signals are transmitted from a source to an acceptor:

Connection cables - Low quality cables are susceptible to interference, they degrade signal quality due to poor matching and cause elevated noise levels. They should therefore be of the best quality.

Sockets and connectors of the sources and acceptors - So often ignored, they should be of highest quality, since "Zero Ohm" connection resistance is the target. Sockets and connectors also must match the required impedance (75 ohms in video). Cheap, low quality connectors tend to rust, thus causing flaws in the signal path.

Amplifying circuitry - Must have quality performance when the desired end result is high linearity, low distortion and low noise operation.

Distance between sources and acceptors - Plays a major role in the final result. For long distances (over 15 meters) between sources and acceptors, special measures should be taken in order to avoid cable losses. These include using higher quality cables or adding line amplifiers.

Interference from neighboring electrical appliances - These can have an adverse effect on signal quality. Balanced audio lines are less prone to interference, but unbalanced audio should be installed far from any mains power cables, electric motors, transmitters, etc. even when the cables are shielded.

2. SPECIFICATIONS

	VM-2N	VM-5S	VM-50A
Configuration	1:2	1:5	1:5
Input Type	1 Composite/single component video 1 stereo audio/balanced mono	1 video (internally selected) looping (composite, single component or serial digital) 1 stereo audio/balanced mono	1 stereo audio
Input Connections	BNC connector (video) RCA connector (audio)	BNC connector with rear termination switch (video) RCA connector (audio)	RCA
Input Level	1Vpp/75ohm (video) +4dBm/50kohm (audio)	1Vpp/75ohm on (video) up to 21V/50kohm (audio)	Looping +4dbm/50kohm
Output Type	2 video 2 stereo audio/balanced mono	5 video (composite, single component or serial digital) 5 stereo audio/balanced mono	5 stereo audio
Output Connector	BNC connector (video) RCA connector (audio)	BNC connector (video) RCA connector (audio)	RCA connectors
Output Level	1Vpp/75 (video) +4dBm/50ohm (audio)	1Vpp/75ohm (video) up to 21V/220ohm (audio)	+4dBm/100ohm
Output Coupling	DC (video) AC (audio)	DC/AC internally selectable	AC
S/N Ratio	Better than 85dB(audio) 75dB (video)	> 82dB @ 1V (audio) 75dB (video)	83db unweighted
Audio Bandwidth	>100KHz, 0 -1db points	100 kHz	50khz, -3db
Video Bandwidth	Exceeding 400 MHz.	Exceeding 350 MHz.	NA
Max audio Output	>24dBm	+20dBm	25Vpp
Max video Output	1.5Vpp	1.7Vpp	NA
Differential Gain	0.05%	0.05%	NA
Differential Phase	0.1Deg.	0.1Deg.	NA
Audio THD+N	0.017%	0.009%	<0.018%
Second harmonic	0.002% @ 1KHz	0.001% @ 1KHz	0.003%
K-Factor	<0.05%	<0.05%	NA
SDI eff. Range	Up to 50 meters	Up to 70 meters	NA
Dimensions (W, D, H)	16.5cm x 12cm x 4.5cm 6.5" x 4.72" x 1.77"	22cm x 18cm x 4.5cm 8.66" x 7.08" x 1.77"	16.5cm x 12cm x 4.5cm 6.5" x 4.72" x 1.77"
Weight	0.620Kg (1.3lbs) Approx.	1.40Kg (3.3lbs.) Approx.	0.62Kg (1.4lbs) Approx.
Power consumption	4.6VA	3.5VA	0.78VA
Power Source	230VAC/50Hz, (115V USA)	230VAC, 50Hz, (115V USA)	12VDC, 40mA

SPECIFICATIONS (continued)

	VM-50H	VM-50YC	VM-50V
Configuration	1:5	1:5	1:5
Input Type	1 stereo audio	1 s-video, looping	1 video, looping
Input Connections	6.5-mm stereo phone sockets	4P connectors with a termination switch	BNC connector with termination switch
Input Level	1Vpp/50kohm	1Vpp/75ohm (Y), 0.3Vpp/75ohm (C)	1Vpp/75ohm
Output Type	5 stereo audio	5 s-video, looping	5 video
Output Connector	6.5-mm stereo phone sockets	4P connectors	BNC connectors
Output Level	250mW/8ohm	1Vpp/75ohm (Y), 0.3Vpp/75ohm (C)	1Vpp/75ohm
Output Coupling	AC	AC	AC
S/N Ratio	Better than 78dB	80.5dB	73db
Audio Bandwidth	20-100,000 Hz. -3dB	NA	NA
Video Bandwidth	NA	280 MHz -3dB (Y)	480MHz -3dB
Max audio Output	8Vpp	NA	NA
Max video Output	NA	2Vpp (Y)	2Vpp
Differential Gain	NA	0.05%	0.05%
Differential Phase	NA	0.05Deg	0.12Deg
Audio THD+N	Less than 0.08% @ 100mW	NA	NA
K-Factor	NA	<0.1%	<0.05%
Level Controls	5 stereo output level controls (front), 1 mono switch (rear)	Y control: Range: -1.6 to 3.3db C Control: -1.6 to 3.3db	Gain Range = -0.8 to 1.9db EQ. control: 0 to 3.2db
Gain Range	70db (-60db to +10db)	-1.6 to 3.3dB	-0.8 to 1.9dB
Dimensions (W, D, H)	16.5cm x 12cm x 4.5cm 6.5" x 4.72" x 1.77"	16.5cm x 12cm x 4.5cm 6.5" x 4.72" x 1.77"	16.5cm x 12cm x 4.5cm 6.5" x 4.72" x 1.77"
Weight	0.68Kg (1.5lbs)	0.58Kg (1.3lbs.)	0.62Kg (1.4lbs.)
Power consumption	15VA	0.6VA	0.48VA
Power Source	12VDC, 1.15A	12VDC, 50mA	12VDC, 40mA

3. HOW DO I GET STARTED?

The fastest way to get started is to take your time and do everything right the first time. Taking 15 minutes to read the manual may save you a few hours later. You don't even have to read the whole manual. At the beginning of each section, you'll find an overview of the section. So if the section doesn't apply to you, you don't have to spend your time reading it.

4. UNPACKING AND CONTENTS

The items contained in your Kramer VM amplifier package are listed below. Please save the original box and packaging materials for possible future transportation and shipment of the amplifier.

- Desktop size amplifier
- AC power cable (where applicable)
- User's Manual
- Rubber feet
- Kramer concise product catalog

For additional information regarding optional cables and additional accessories, contact your Kramer dealer.

4.1 Optional Accessories

The following Kramer accessories can enhance implementation of your amplifier.

- **Rack Adapter -** Used to adapt non-standard size machines to a standard 1U rack. One or more machines may be installed on each adapter.

- **BNC "Y" Connector -** Used for looping purposes and splits the incoming signal to enable connection of an additional machine.

- **Termination Plug -** Used to terminate the line to 75ohm for proper matching.

- **SP-40** - (video/audio Processor) Serially connected between the video/audio source and the VM amplifier for video and audio processing. The machine is a high quality processor used for video control and correction in duplication and production studios, camera control, luminance and white balance correction. The SP-40 is capable of Composite to Y/C conversion and bi-directional transcoding. The machine allows video gain control down to full fade, definition control, contrast control, color saturation control, black level control, audio mix control for mixing between the selected source and an audio AUX source and a screen splitter control for "before-after" comparison. The unique limiter switch in the SP-40 allows true signal limiting and special effects.

- **SP-11** - (video/audio Processor) can be serially connected between the video/audio source and the VM amplifier for video and audio control/correction. The machine provides camera control and luminance/white balance correction. The SP-11 is also capable of performing composite to Y/C conversion and bi-directional transcoding. The machine allows full control over the video signal: video gain down to full fade, log or linear definition control, log or linear contrast control, color saturation control, black level control, red, green and blue controls and a screen splitter control for "before-after" comparison. The Input switch control is "audio-follow-video".

- **104L** - (video Line Amplifier) Serially connected between the video source and the VM amplifier for video processing, the machine is used for video line amplification and cable compensation, video field work and SDI signal distribution. Signal loss and the resulting depreciation in picture quality is a real problem in any video setup requiring considerable distance between video source and acceptors. The KRAMER 104L video Line Amplifier, one of the KRAMER TOOLS, is a high quality amplifier, which prevents video signal losses over long cables. For best results the 104L amplifier is installed adjacent to the video source. The 104L is housed in the compact KRAMER TOOLS enclosure and is fed by a 12VDC source. High bandwidth and front accessible controls make it suitable for the most demanding analog and SDI studio applications.

- **VM-9YC** - (video/audio Line Amplifier) Serially connected between the video/audio source and the VM amplifier for video and audio processing, the machine is a high quality video/stereo amplifier which compensates for video and audio signal losses when long cables are used. In any video/audio setup requiring considerable distances between video/audio source and acceptors, signal loss and thus depreciation in the quality of both picture and sound is a real problem. To prevent this phenomenon, a VM-9S amplifier is installed adjacent to the video/audio source.

- **VM-4E** - (A Precision Mechanical 4x4 video/audio Switcher) Several video/audio sources may be connected to its inputs for switching. The machine may be used in every application where easy and fast video and audio source selection is needed and for high isolation between inputs. All unselected inputs are internally terminated with 75-Ohm resistors. The VM-4E switches video, SDI and any other high frequency signals. The VM-4E is housed in a small enclosure, occupying very little desk space.

- **VM-81AV** - (A Precision Mechanical 8x1 video/stereo audio Switcher) Several video/audio sources may be connected to its inputs for switching. The machine offers fast and easy video/audio source and acceptor selection. The VM-81AV provides high isolation between inputs and outputs and all unselected video inputs are internally terminated with 75-Ohm resistors. The VM-81AV is housed in a professional 19" rack mountable enclosure.

- **VS-801xl**- (8:1 Composite/Single Component video & Unbalanced audio Switcher) Several video/audio sources may be connected to its inputs for switching. The machine provides truly effortless switching between eight video and unbalanced audio inputs and one output. Switching is done during vertical interval, either of source no. 1 or of the video available on the external sync socket. The switcher may be controlled by touch buttons or by contact closure via a remote socket on the back of the machine. video signal bandwidth is 225 MHz (typical), allowing the machine to be used in the most demanding applications.

- **TP-1** (video Line Transmitter) If a DA output is sent over a long distance (100 meter or more), it is necessary to convert the signal to twisted pair type. The TP-1 sends a color video signal over long distances using telephone wire or any other twisted pair wire thus extending the range of operation of a DA. The TP-1 maintains the bandwidth of an industrial color video signal up to several hundred meters and of broadcast quality (up to 12 MHz) signals up to 100 meters. At shorter distances, as in a studio, bandwidth of 30MHz is easily achieved. By using the KRAMER TP-1 together with the TP-2 (video Line Receiver) coax wiring (in a studio, for example) can be completely eliminated. The TP-1 can also be used for

simplification of security and CCTV installations, and for teleconferencing in offices and hospitals using existing intercom or telephone wiring.

- **VA-11AV -** (video/audio Combiner) Used to distribute video/audio signals. The machine can be inserted in front of a DA, allowing the DA to distribute a video signal and two audio signals simultaneously. It sends a color video signal and a stereo audio signal using only one standard coax cable in real time. The machine maintains the bandwidth of an industrial color video signal and the output signal may be viewed and recorded as a normal video signal. By using the VA-11AV together with the VA-12AV (video/audio Separator) the audio stereo signal may be recovered so audio signals may be sent in a hidden mode, to be recovered only by the VA-12AV. The VA-11AV can be used for simplification of security and CCTV installations, using existing video coax wiring for video and audio transmissions.

- **611T/611R -** (611T Fiber Optic Transmitter and 611R Fiber Optic Receiver) Part of the KRAMER TOOLS series, and designed for studio and other demanding applications, these machines, in combination, may be used to send one of the distributed channels to distances of 5-25Km. The full bandwidth 611T and matching 611R use state-of-the-art fiber optic circuitry and allow the user (via rear panel trimmers) to adjust input and output video levels and high frequency peaking to achieve best performance.

- **VIDEO TESTER** - A new, unique, patented, indispensable tool for the video professional, the video Tester is used to test a video path leading to/from an amplifier. By pressing only one touch switch it can trace missing signals, distinguish between good and jittery (VCR sourced) signals, and identify the presence of good signals. Whenever a video signal is missing, because of bad connections, cable breaks or faulty sources, the video Tester is all you need.

5. VM SERIES AMPLIFIERS

This section describes all the controls and connections of your amplifier. Understanding all of the controls and connections helps you realize its full power.

5.1 Getting To Know Your VM-2N

The KRAMER **VM-2N** is an ultra-high bandwidth, state-of-the-art video/stereo audio Distribution Amplifier designed for analog and digital studio applications. The **VM-2N** splits a single input source, be it composite, single component or Serial Digital video, into two identical outputs with no discernible signal degradation. video output signals are DC coupled. The audio can be either unbalanced stereo or balanced mono, as the audio performance and levels of the **VM-2N** are appropriate for use in the most demanding applications.
Front/Rear panel features of the **VM-2N** are described in Figure 1 and Table 1.

NOTE
For operation instructions refer to section 9.1.

Figure 1: VM-2N Front/Rear Panel Features

Table 1: VM-2N Front/Rear Panel Features

No.	Feature	Function
1.	Illuminated power switch (on front panel)	Supplies power to the unit.
2.	**VIDEO IN** BNC connector	video input
3.	**OUT 1-OUT 2** BNC connectors	2 amplified and buffered video outputs.
4.	**AUDIO IN** RCA connectors (L, R)	audio input
5.	**OUT 1-OUT 2** RCA audio connectors (L, R)	2 amplified and buffered audio outputs.
6.	Power connector	A 3-prong AC connector allows power to be supplied to the unit. Directly underneath this connector, a fuse holder houses the appropriate fuse.

5.2 Getting To Know Your VM-5S Amplifier

The KRAMER **VM-5S,** an upgrade of the VM-6NS, is an ultra-high bandwidth, video/stereo audio Distribution Amplifier designed for analog and digital studio applications. The **VM-5S** splits a single input source - composite, single component or Serial Digital video - into five identical outputs. video output signals can be AC or DC coupled (factory default is DC) and inputs can be looped through using an external termination switch. The audio can be either unbalanced stereo or balanced mono. The machine is housed in a half 19" wide enclosure, and two machines may be mounted side-by-side in a 1U 19" rack space using an optional adapter. Front/Rear panel features of the **VM-5S** are described in Figure 2 and Table 2.

NOTE

For operation instructions refer to sections 9.1, 9.2.

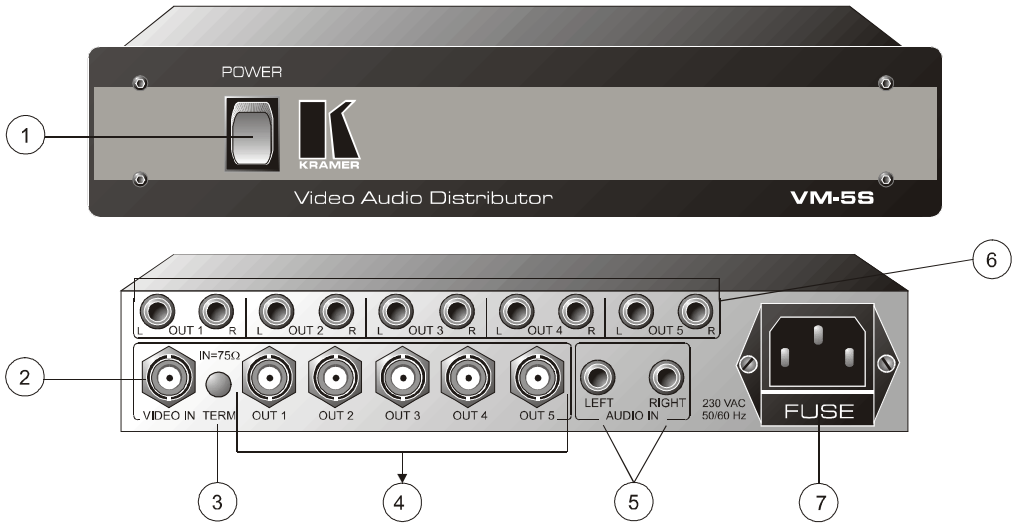

Figure 2: VM-5S Front/Rear Panel Features

Table 2: VM-5S Front/Rear Panel Features

No.	Feature	Function
1.	Illuminated power switch (on front panel)	Supplies power to the unit.
2.	**VIDEO IN** BNC connector	video input
3.	**TERM** pushbutton	Selects "**75ohm**" or "**HI-z**" impedance (pressed=75ohm**).** For looping select "**Hi-z**".
4.	**OUT 1-OUT 5** BNC connectors	5 amplified and buffered video outputs.
5.	**AUDIO IN** RCA connectors (**LEFT**, **RIGHT**)	audio input
6.	**OUT 1-OUT 5** RCA connectors (L, R)	5 amplified and buffered audio outputs.
7.	Power connector	A 3-prong AC connector allows power to be supplied to the unit. Directly underneath this connector, a fuse holder houses the appropriate fuse.

5.3 Getting To Know Your VM-50A Amplifier

The KRAMER **VM-50A** is a high quality, state-of-the-art stereo audio Distribution Amplifier designed for studios, shops, showrooms and other demanding applications.

The **VM-50A** splits a single stereo input source into five identical outputs. The **VM-50A** uses an external 12V DC power source, and therefore is suitable for fieldwork as well. The machine has unique built-in circuitry, which allows high signal level processing even while using a 12VDC power source. The **VM-50A** machine is a perfect match to the **VM-50V/50YC** video/s-video DAs.

Front/Rear panel features of the **VM-50A** are described in Figure 3 and Table 3:

NOTE

For operation instructions refer to sections 9.1, 9.2.

Figure 3: VM-50A Front/Rear Panel Features

Table 3: VM-50A Front/Rear Panel Features

No.	Feature	Function
1.	Illuminated power switch (on front panel)	Supplies power to the unit.
2.	**IN (L, R)** RCA connectors	Audio input.
3.	**LOOP** in RCA connectors	Provides audio looping capability to increase number of outputs.
4.	**OUTPUTS 1-5** RCA connectors	5 amplified and buffered audio outputs.
5.	**12VDC** feed connector	A DC connector that allows power to be supplied to the unit. An internal fuse holder houses the appropriate fuse (see location of fuse in Figure 9).

5.4 Getting To Know Your VM-50H Amplifier

The KRAMER **VM-50H** is a high quality, state-of-the-art, stereo Headphone Distribution Amplifier designed for studios, shops, showrooms, museums and audio fieldwork.
The **VM-50H** splits a single stereo input source into five identical outputs, each output level is individually controllable. The **VM-50H** uses an external 12VDC power source, and therefore is suitable for fieldwork as well. The **VM-50H** can drive low impedance headphones or 5 stereo sets of small loudspeakers. The machine has a mono switch and thus can deliver 10 identical mono outputs instead of 5 stereo outputs.
Front/Rear panel features of the **VM-50H** are described in Figure 4, Table 4 and Table 5.

NOTE
For operation instructions refer to sections 9.1and 9.5.

Figure 4: VM-50H Front/Rear Panel Features

Table 4: VM-50H Front Panel Features

No.	Feature	Function
1.	Illuminated power switch (on front panel)	Supplies power to the unit.
2.	**LEVEL CONTROL (Out1- Out5)** knobs	Control audio output level of outputs 1-5.

Table 5: VM-50H Rear Panel Features

No.	Feature	Function
1.	**Input** 6.5mm socket	audio input
2.	**Mono** pushbutton	Converts 5 stereo audio outputs to 10 mono outputs when pressed.
3.	**Out 1- Out 5** 6.5mm socket	5 amplified and buffered audio outputs.
4.	**12VDC** feed connector	A DC connector that allows power to be supplied to the unit. An internal fuse holder houses the appropriate fuse (see location of fuse in Figure 9).

5.5 Getting To Know Your VM-50YC Amplifier

The KRAMER **VM-50YC** is a high quality, state-of-the-art, s-video Distribution Amplifier designed for studios, shops, showrooms and other demanding applications. The **VM-50YC** splits a single input source into five identical outputs. The **VM-50YC** uses an external 12VDC power source, and therefore is suitable for fieldwork as well. Dozens of copies of videotapes can be made at the same time using several **VM-50YC** units chained through the looping inputs.
Front/Rear panel features of the **VM-50YC** are described in Figure 5 and Table 6.

NOTE
For operation instructions refer to sections 9.1, 9.2.

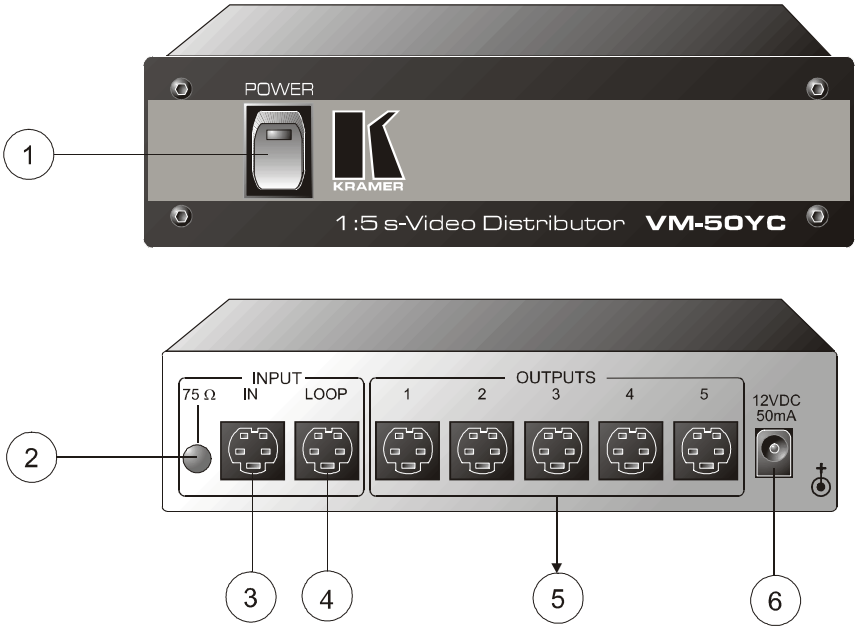

Figure 5: VM-50YC Front/Rear Panel Features

Table 6: VM-50YC Front/Rear Panel Features

No.	Feature	Function
1.	Illuminated power switch (on front panel)	Supplies power to the unit.
2.	**Hi-Z/75 Ohms** switch	Selects "**75ohm**" or "**HI-z**" impedance (pressed="**75ohm**"). For looping select "**Hi-z**".
3.	**Input** 4p connector	video input
4.	**LOOP** 4p connector	Provides video looping capability to increase number of outputs.
5.	**OUTPUTS 1- 5** 4p connectors	5 amplified and buffered video outputs.
6.	**12VDC** feed connector	A DC connector that allows power to be supplied to the unit. An internal fuse holder houses the appropriate fuse (see location of fuse in Figure 9).

5.6 Getting To Know Your VM-50V Amplifier

The KRAMER **VM-50V** is a high quality, state-of-the-art, video Distribution Amplifier designed for studios, shops, showrooms and other demanding applications. The **VM-50V** splits a single input source into five identical outputs. The **VM-50V** uses an external 12VDC power source, and therefore is suitable for fieldwork as well. Dozens of copies of videotapes can be made at the same time using several **VM-50V** units chained through the looping inputs.
Front/Rear panel features of the **VM-50V** are described in Figure 6 and Table 7.

NOTE
For operation instructions refer to sections 9.1, 9.2.

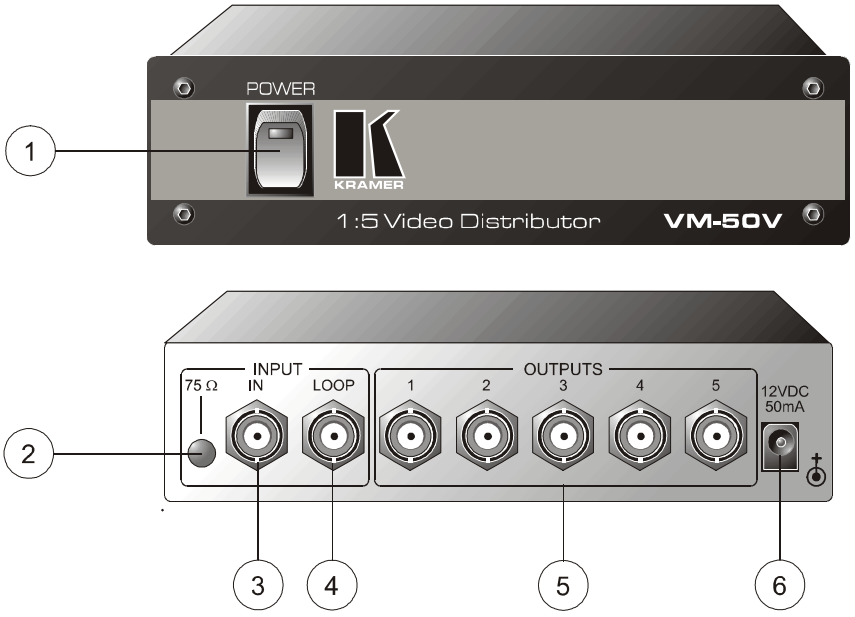

Figure 6: VM-50V Front/Rear Panel Features

Table 7: VM-50V Front/Rear Panel Features

No.	Feature	Function
1.	Illuminated power switch (on front panel)	Supplies power to the unit.
2.	**Hi-Z/75** Ohms switch	Selects "**75ohm**" or "**HI-z**" impedance (pressed="**75ohm**"). For looping select "**Hi-z**".
3.	**INPUT** BNC connector	video input
4.	**LOOP** BNC connector	Provides audio looping capability to increase number of outputs.
5.	**OUTPUTS 1- 5** BNC connectors	5 amplified and buffered video outputs.
6.	**12VDC** feed connector	A DC connector that allows power to be supplied to the unit. An internal fuse holder houses the appropriate fuse (see location of fuse in Figure 9).

6. INSTALLATION

The amplifier is provided with four rubber feet packed in a separate bag. Fit the feet to the unit, place it on the table remote from heat generating sources and make the required connections. Use a rack adapter in case a rack installation is required (see section 4.1 "Rack Adapters"), in which case do not attach the feet.

7. CONNECTING TO VIDEO DEVICES

Video sources and output devices (such as amplifiers or recorders) may be connected to the amplifier through the BNC connectors (VM-2N, VM-5S and VM-50V models) or 4p type connectors (VM-50YC model) located at the back of the machine. Please keep in mind that the output signal format will match that of the input signal format. All signal connections that use more than one cable interconnecting between devices should be of equal length.

8. CONNECTING TO AUDIO DEVICES

Audio sources and output devices (such as amplifiers or recorders) may be connected to the amplifier through the RCA type connectors (VM-2N, VM-5S) and through 6.5mm phone sockets (VM-50H) located at the back of the machines.

9. USING THE VM VIDEO/AUDIO AMPLIFIERS

9.1 Powering On The Amplifier

NOTES

1. *Amplifier should only be powered on after all connections are completed and all source devices have been powered on. Do not attempt to connect or disconnect any video, audio or control signals to the amplifier while it is powered on!*
2. *The socket-outlet should be near the equipment and should be easily accessible. To fully disconnect equipment, remove power cord from its socket.*

1) Press the toggle switch on the far-left front panel to the up position. In the up position, the toggle switch glows, and the active input button illuminates as well.
2) Operate the acceptors.

9.2 Looping

The looping function enables the operator to extend the number of outputs per input. The following example describes looping performed by using 3 amplifiers with one input and 5 outputs each: A video signal reaches input of amplifier No. 1. From looping connector of amplifier No. 1 a cable is connected to input socket of amplifier No. 2. The loop output of amplifier No. 2 is connected to the input socket of amplifier No. 3. In this way the input signal is divided into 15 separate output signals. The operator must always switch to "**Hi-z**" the termination switch of all the amplifiers but the last. The **last** amplifier's termination switch should always be at "**75ohm**" to maintain well-matched video line (of 75ohm impedance) from first to last amplifier. Note that if looping function is not used, the termination switch should be set to "**75 ohm**".

9.3 Coupling

The coupling function enables the operator to determine whether the incoming video signal is DC or AC coupled. When DC coupling is selected and proper standard video signal is applied to the amplifier's input, the output signal is equal to the input signal. When AC coupling is selected, DC components of the incoming signal are removed. DC coupling is always preferable since AC coupling might cause some linearity distortions in low and high frequencies (due to non-ideal behavior of capacitors). A problem may arise when the incoming signal is riding on a DC offset especially when the acceptors are highly effected by deviation of DC offsets (A to D converters for example), which in turn results in a distorted picture.

9.4 Coupling Selection

(VM-5S Only)

The VM-5S comes with a DC coupling from the factory. Selecting AC Coupling is performed by removing J2 internal jumper. To remove jumper, perform the following steps:

1) Using a Philips screwdriver, remove the Philips head screws from the cover and remove the cover.
2) Locate J2 internal jumper on the internal printed board (see Figure 7) and remove it.
3) Reinstall the cover.

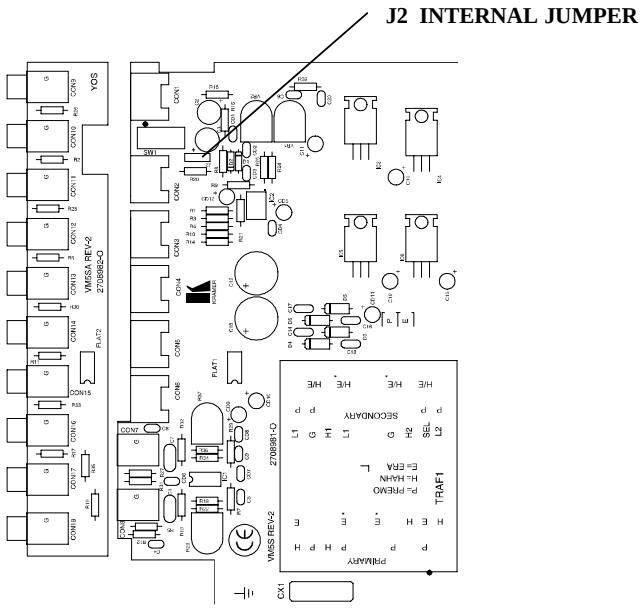

Figure 7: J2 Internal Jumper Location

9.5 Audio Level Control

(VM-50H Only)

To enable stereo audio control, verify that the "**Mono**" button is released. Then gently adjust the **LEVEL CONTROL** Gain knobs to control the appropriate output audio gain to achieve satisfactory audio level. To enable mono audio level control, select "**Mono**" position by pressing the "**Mono**" pushbutton. Then, using the **LEVEL CONTROL** Gain knobs**,** adjust gently the audio stereo level to achieve satisfactory audio level.

9.6 Installing a VM Amplifier In a Mixed AC/DC Video/Audio System

Video accessories use two basic forms of connection to sources and acceptors: AC coupled or DC coupled. Each form has its own advantages and downbacks. DC coupling provides a non-distorted signal, transferring accurately the DC contents of input signals to the outputs. AC coupling suffers from problems related to bad quality, low frequency response and the "breathing" effect. However, AC coupling isolates the acceptors from an erroneous DC level sometimes found in video sources. If a video acceptor is too sensitive to the DC content transferred to it via the DA from the source, AC coupling is preferred. AC coupling may be initiated by either using a "AC/DC" coupling switch available on some of the video DAs, or adding DC-removing components externally.
Perform the following steps (if necessary):

1) Connect the video source to the DA.
2) Add external coupling capacitors to each output of the DA that needs AC coupling.
3) Connect the acceptors to the outputs of the DA. Connect the DC coupled acceptors directly and connect the AC coupled acceptors via back to back connected 1000μF/25V capacitors (See Figure 8).

A useful tip:
The capacitor may be "stitched" on the coaxial cable directly, by carefully separating the shield from the signal leading conductor, cutting this conductor and connecting the capacitor serially.

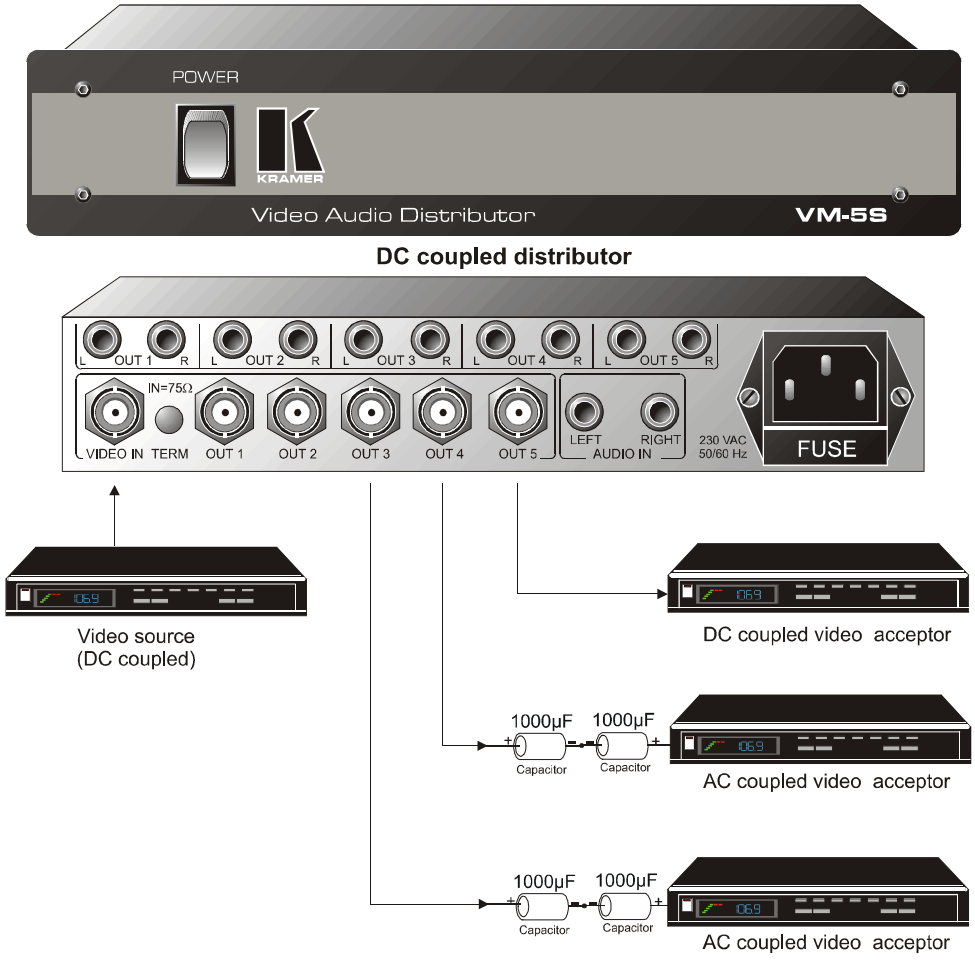

Figure 8: Installing a VM Amplifier In a Mixed AC/DC Video/Audio System

10. TAKING CARE OF YOUR AMPLIFIER

Do not locate your amplifier in an environment where it is susceptible to dust or moisture. These may damage the electronics, and cause erratic operation or failure. Do not locate your amplifier where temperature and humidity may be excessive. Do not clean your amplifier with abrasives or strong cleaners. Doing so may remove or damage the finish, or may allow moisture to build up. Take care not to allow dust or particles to build up inside unused or open connectors.

11. TROUBLESHOOTING

NOTES

1. *Please note that if the output signal is disturbed or interrupted by very strong external electromagnetic interference, it should return and stabilize when such interference ends. If not, turn the power switch off and on again to reset the machine.*
2. *If the recommended actions still do not result in satisfactory operation, please consult your KRAMER Dealer.*

11.1 Power And Indicators

Problem	Remedy
No Power	1. Confirm that the rocker switch is in the "ON" position, and that the red LAMP/LED is illuminated. 2. Confirm that power connections are secured at the amplifier and at the receptacle. Make sure the receptacle is active, outputting the proper mains voltage. ➢ **For models VM-50A, VM-50H, VN-50V, VM-50YC, perform the following:** 1. Using a Philips screwdriver, remove screws attaching the machine's cover. 2. Locate fuse holder located inside your amplifier (see Figure 9). Confirm that the fuse is good by looking for the wire connected between the ends of the fuse. If this wire is broken, replace fuse with another, with the same rating. 3. Install cover by tightening the Philips screws. ➢ **For models VM-2N, 5S, perform the following:** Remove power cord from AC outlet and the machine and then using a flat head screwdriver, remove fuse holder located directly below the power connector on your amplifier. Confirm that the fuse is good by looking for the wire connected between the ends of the fuse. If the wire is broken, replace the fuse with another, with the same rating.

11.2 Audio Signal

(VM-2N, VM-5S, VM-50A, VM-50H Only)

Problem	Remedy
No audio at the Output Device, Regardless of Input Selected	1. Confirm that your sources and output device are powered on and connected properly. Audio signals connected to the input of your amplifier should be properly wired to the output of your source. Audio signals connected to the output of your amplifier should be properly wired to the input of your amplifier or recorder. 2. Confirm that any other amplifiers in the signal path have the proper input and/or output selected. Pay special attention to input amplifiers that may be built into your amplifier or recording device.
Audio level is too low	1. Confirm that the connecting cables are of high quality and properly built. Take special care in noting the wiring configuration of balanced to unbalanced cables. 2. Check level controls located on your source input device or output device.

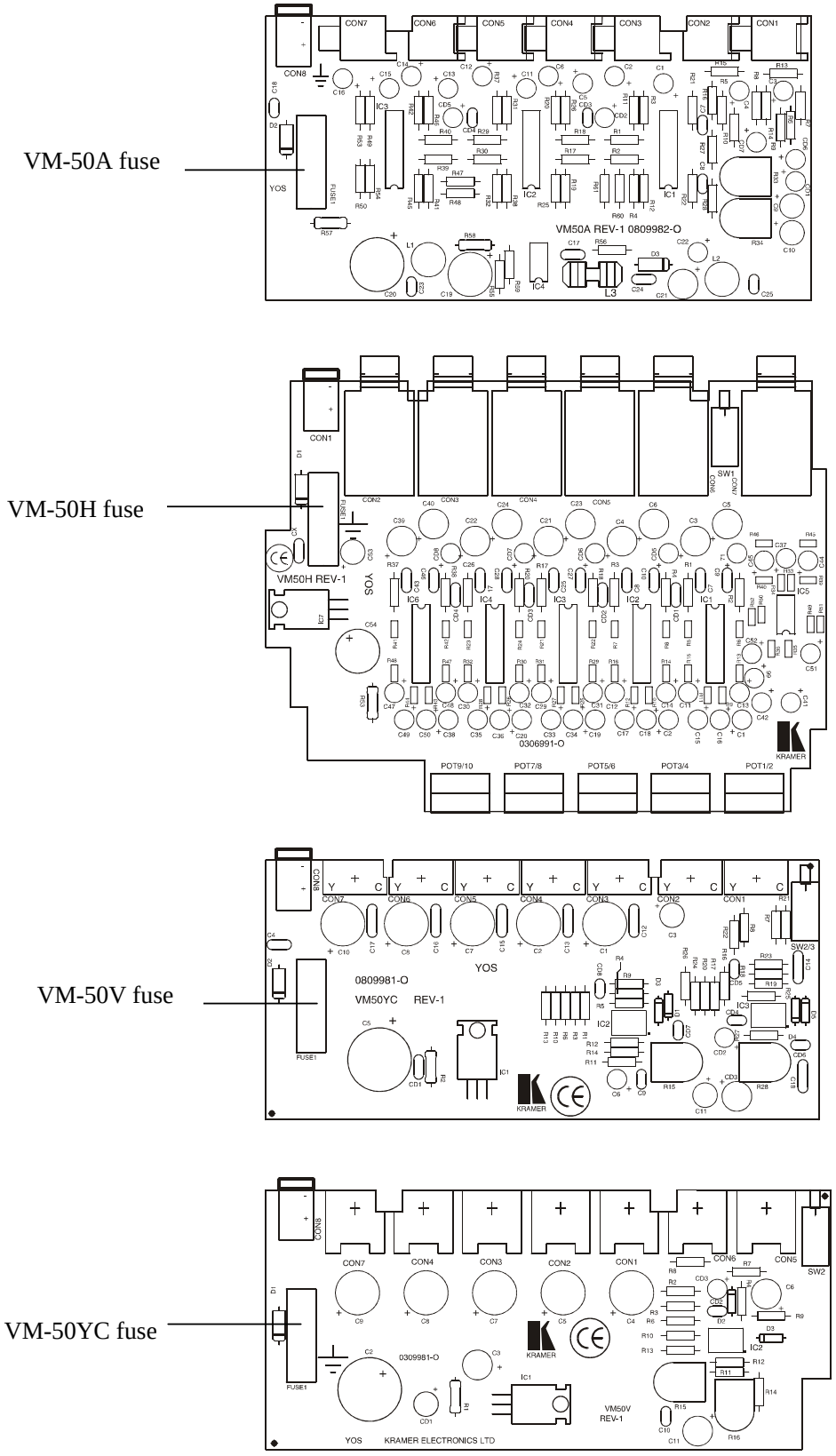

Figure 9: Locating The Internal Fuses

11.3 Video Signal

(VM-2N, VM-5S, VM-50V and VM-50YC only)

Problem	Remedy
No video at the output device, regardless of input selected	1. Confirm that your sources and output device are powered on and connected properly. Video signals connected to the input of your amplifier should be of an identical signal format at the output of your source. Video signals at the output of your amplifier should be of an identical signal format as at the input of your display or recorder. 2. Confirm that any other amplifiers in the signal path have the proper input and/or output selected. 3. Use the video Tester to test the video path leading to/from your amplifier (see section 4.1 " video Tester")
Video level is too high or too low	1. The amplifiers in this manual (except for the VM-2N) have termination switches on each input. Verify that the video line is well interfaced through 75ohm impedance, otherwise it results in a video level that is too high or too low. Check if looping is used and if termination switch is in the proper position for this state. 2. Confirm that the connecting cables are of high quality, properly built and terminated with 75ohm BNC connectors. Check level controls located on your source input device or output device.
Noise bars "roll" up or down in the output image or: Low frequency hum in the output signal	Hum bars (ground loop) are caused by a difference in the ground potential of any two or more devices connected to your signal path. This difference is compensated by passing that voltage difference through any available interconnection, including your video cables. **WARNING!** ***Do not disconnect the ground from any piece of video equipment in your signal path!*** Check the following to remove hum bars: 1. Confirm that all interconnected equipment is connected to the same phase of power. 2. Remove equipment connected to this phase that may be introducing noise, such as motors, generators, etc. 3. Disconnect all cables and reconnect them one at a time until ground loop reappears. Disconnect the affected cable and replace, or insert an isolation device (opto isolator or transformer) in the signal path.

LIMITED WARRANTY

Kramer Electronics (hereafter Kramer) warrants this product to be free from defects in material and workmanship under the following terms.

HOW LONG IS THE WARRANTY

Labor and parts are warranted for three year from the date of the first customer purchase.

WHO IS PROTECTED

Only the first purchase customer may enforce this warranty.

WHAT IS COVERED AND WHAT IS NOT COVERED

Except as below, this warranty covers all defects in material or workmanship in this product. The following are not covered by the warranty:

1) Any product which is not distributed by Kramer or which is not purchased from an authorized Kramer dealer. If you are uncertain as to whether a dealer is authorized, please contact Kramer at one of the agents listed in the web site **www.kramerelectronics.com**.
2) Any product, on which the serial number has been defaced, modified or removed.
3) Damage, deterioration or malfunction resulting from:
    a) Accident, misuse, abuse, neglect, fire, water, lightning or other acts of nature, unauthorized
    b) Product modification, or failure to follow instructions supplied with the product.
    c) Repair or attempted repair by anyone not authorized by Kramer.
    d) Any shipment of the product (claims must be presented to the carrier).
    e) Removal or installation of the product.
    f) Any other cause, which does not relate to a product defect.
    g) Cartons, equipment enclosures, cables or accessories used in conjunction with the product.

WHAT WE WILL PAY FOR AND WHAT WE WILL NOT PAY FOR

We will pay labor and material expenses for covered items. We will not pay for the following:

1) Removal or installations charges.
2) Costs of initial technical adjustments (set-up), including adjustment of user controls or programming. These costs are the responsibility of the Kramer dealer from whom the product was purchased.
3) Shipping charges.

HOW YOU CAN GET WARRANTY SERVICE

1) To obtain service on you product, you must take or ship it prepaid to any authorized Kramer service center.
2) Whenever warranty service is required, the original dated invoice (or a copy) must be presented as proof of warranty coverage, and should be included in any shipment of the product. Please also include in any mailing a contact name, company, address, and a description of the problem(s).
3) For the name of the nearest Kramer authorized service center, consult your authorized dealer.

LIMITATION OF IMPLIED WARRANTIES

All implied warranties, including warranties of merchantability and fitness for a particular purpose, are limited in duration to the length of this warranty.

EXCLUSION OF DAMAGES

Kramer's liability for any defective products is limited to the repair or replacement of the product at our option. Kramer shall not be liable for:

1) Damage to other property caused by defects in this product, damages based upon inconvenience, loss of use of the product, loss of time, commercial loss; or
2) Any other damages, whether incidental, consequential or otherwise. Some countries may not allow limitations on how long an implied warranty lasts and/or do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations and exclusions may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights, which vary from place to place.

NOTE: All products returned to Kramer for service must have prior approval. This may be obtained from your dealer.

NOTICE

This equipment has been tested to determine compliance with the requirements of:

EN-50081:	"Electromagnetic compatibility (EMC); generic emission standard. Part 1: Residential, commercial and light industry"
EN-50082:	"Electromagnetic compatibility (EMC) generic immunity standard. Part 1: Residential, commercial and light industry environment".
CFR-47	FCC Rules and Regulations: Part 15- "Radio frequency devices: Subpart B- Unintentional radiators

CAUTION

- Any user who makes changes or modifications to the unit without the express approval of the manufacturer will void user authority to operate the equipment.
- Use the supplied AC power cord to supply power to the switcher and controllers.
- Please use recommended interconnect cables to connect the switcher to controllers and other components.

For the latest information on our products and a list of Kramer distributors, visit our Web site: www.kramerelectronics.com. Updates to this user manual may be found at http://www.kramerelectronics.com/manuals.html. We welcome your questions, comments and feedback.

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